MNACC RESEARCH AND DEVELOPMENT COMPARISON PROJECT

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CONTRACT SERIAL NO. 23440-0-9166-01-SQ

CONTRACT REQ' NO. 23440-0-9166

CONTRACTOR: ALDERSEY TECHNOLOGY INC.

20 pp

D.S.S. Contract 38 SQ.23440-0-9166

MICROMEDIA

92-00206/

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EXECUTIVE SUMMARY

This study compares CANMET with various federal and provincial R&D funding and performing organizations to:

- determine the degree of overlap in mandate, work and funding; and
- compare cost-recovery practices.

Types of organizations contacted included those with a mandate to develop complementary technologies to those of CANMET, such as the National Research Council (NRC) of Canada and Environment Canada (EC), and those involved in technologies similar to CANMET but with emphasis on different parts of the R&D spectrum. Contact was made by telephone and in person.

Personal interviews are reported and analyzed with respect to:

- the R&D portfolio balance of the various organizations;
- the opportunity for increased cooperation between these organizations and CANMET;
- existing mechanisms for cooperation; and
- cost-recovery practices utilized by CANMET and these organizations.

This study concluded that there is a desirable degree of overlap with organizations such as the NRC and EC which perform R&D on technologies complementary to those within CANMET's mandate. CANMET is the primary federal link with the energy, mining, minerals and metals industry sectors, and is recognized as the national leader in related technology development. As industrial interest builds in complementary technologies such as biotechnology, information technologies, advanced industrial materials and the environment, there may be an opportunity for CANMET to become more pro-active in developing jointly conducted technology packages.

There appears to be a lack of awareness in CANMET of NSERC/Industry Research Chair activity and particularly Provincial Science Council programs, both of which tend to be upstream of CANMET. Stronger links with these programs could help CANMET to identify innovative concepts in their early stages of development.

In general, working relationships with the Provincial Research Organizations (PROs) appear to be effective and complementary. This also requires that there be some overlap. The tar sands and heavy oils technology area, particularly upgrading, can benefit from increased collaboration and cooperation; mechanisms such as Memoranda of Understanding (MOU) with PROs exist for this purpose. PROs believe there is a complementary downstream role which they can play in cooperation with CANMET, and have expressed interest in developing agreements to define joint efforts.

Since investigation of specific cases of competition between CANMET and the PROs was outside the terms of reference of this study, no details are included. However, identification of such cases and perceptions of PROs affected have been provided to CANMET management for its information together with recommendations resulting from this study.

INTRODUCTION

In December, 1986, following discussions with the Ministry of State for Science and Technology (MOSST) and other departments with Science and Technology mandates, the Treasury Board (TB) released the Government Technology Centres Policy. It was envisaged that successful implementation of the policy would result in an overall increase in industry R&D expenditures relative to the Gross Domestic Product. An integral part of the policy was the provision of marketing incentives to Technology Centres for certain activities as a means of increasing revenues from clients. These incentives applied to:

- contract revenue from the sale of goods, services and processes developed through a centre's R&D activities and the rental of facilities for R&D purposes;
- contributions and grants to a Centre from industry, provinces, or sources;
- the non-federal share of joint projects where the federal share is at least 50 percent; and
- royalties and fees from licences or publications.

CANMET, as a designated Government Technology Centre, has implemented a number of major strategic and operational changes over the past five years in response to this policy. Major strategic objectives were and remain:

- to increase the relevance to clients of CANMET's R&D activities;
- to stimulate increased R&D within industrial clients' operations; and
- to decrease the costs to government of CANMET's operations.

To achieve these objectives CANMET has identified specific targets each year in its Business Plan. Key targets include:

- an increase in revenues generated through contracted-in projects;
- a stimulation of client participation financially in CANMET's in-house R&D projects;
- an increase in industrial client cost-sharing of CANMET-administered contracts; and
- an increase in two-way secondments between CANMET and industrial or provincial organizations.

In addition, CANMET has strengthened its industrial advisory process with the creation of the Minister's National Advisory Council to CANMET (MNACC).

The resulting changes in CANMET operations have taken place during a period of continuing pressure on PROs to become financially self-sustaining. The past few years have also seen a shift in focus within academia towards greater university-industry interaction. This has produced a corresponding increase in funding. The result has been a movement towards shorter-term applied R&D within the overall R&D portfolios of these three classes of organizations.

The industrial client market on which CANMET, other Government Technology Centres, such as the NRC, PROs and universities depend is also undergoing change. There is little firm evidence that industry R&D expenditures are increasing significantly. Moreover, industry R&D has become

less competitive, and the areas of interest have broadened. It is relatively common now for industrial R&D organizations to share technology development costs, risks, and benefits with their competitors and with government R&D performers and universities. Furthermore, areas of interest to the mining, metals and energy industries now include the so-called strategic technologies: biotechnology, information technology and, to a lesser extent, advanced materials. This greater reliance on partnerships and collaboration, and the increased breadth of R&D interest, have placed increased demands on industry research personnel. Therefore, to decrease the personnel demands on industry and maximize the benefits to industry, it is of prime importance that the institutional R&D delivery organizations work cooperatively. CANMET is seen as a national leader with influence on other R&D performers.

OBJECTIVE

MNACC, in recognition of the strategic changes taking place within CANMET and other R&D organizations, has commissioned this study. Its objective is to contrast CANMET with other federal and provincial research organizations to:

- determine the degree of actual or potential overlap in mandate, work and funding; and
- compare cost-recovery practices.

APPROACH

Task 1. A list of relevant R&D organizations was prepared and approved by CANMET. See Table 1. Neither federal nor provincial Crown corporations were included since they function essentially as private sector corporations.

Task 2. Business plans, annual reports and other program-related documents published by these organizations were reviewed. Specific information was sought on the following points:

- areas of technology development activity and relative emphasis;
- overall balance of portfolio for R&D activities overlapping with those of CANMET: i.e., short, medium or long-term;
- extent of development of consortia-supported activities;
- cost-recovery practices, including the degree to which an organization is financially self-sustaining, and policies concerning competition with government and private sector organizations;

Task 3. Directors or delegated senior officers of all CANMET Divisions were contacted either in person or by telephone. Other federal government departments and/or organizations were contacted, including those with a mandate of prime importance to CANMET, and with whom there is substantial cooperation.

All Provincial Research Organizations were contacted by telephone. Contact persons were presidents or senior officers with management responsibilities in the natural resources area. They were asked to elaborate on issues relating to CANMET which were identified by the Association of Provincial Research Organizations. In addition, all contact persons were asked for their views on the effectiveness of collaborative projects or agreements with CANMET and for their opinions on future actions that might be undertaken concerning cooperation with CANMET.

Provincial Departments contacted were restricted to those undertaking significant energy R&D programs. Since the first round of Mineral Development Agreements (MDA) is now complete and negotiations are in progress towards development of a new set of

Agreements, this area was excluded. Provincial Departments of Environment were excluded as CANMET's primary contact with these organizations is, in principle, through Environment Canada.

Task 4. A visit to the New Brunswick Research and Productivity Council took place to discuss in greater depth specific cases of competition for contracted-in services and the impacts of such competition on a PRO.

RESULTS

A. Federal Government

National Research Council (NRC)

The NRC, also operating as a Government Technology Centre, is under pressure similar to CANMET for revenue generation. Movement in this direction has accelerated substantially within the past year. Client collaboration and consortia-supported projects are the main strategic thrusts at NRC.

NRC has established a Resource Technology Program (RTP) within the last 3 years as a means of focusing the development of facilitating technologies for the resource industry. The overall R&D portfolio balance is estimated by NRC to be about 80% in the 2 to 5-year spin-off time-frame. This places the RTP at NRC slightly upstream of CANMET since a maximum of 10% of CANMET's in-house resources are allocated to exploratory (generally longer-term applied research) projects. Use of the 10% allocation at CANMET ranges from about 3% (EPL) to 10% (MSL, MTL).

Cost recovery targets for NRC (to be achieved through provision of services but primarily by undertaking consortia-supported projects) are roughly double those of CANMET. No unique facilities have been defined in the NRC RTP, hence revenues in this area are associated with joint projects. There is little or no competition between NRC and CANMET in the area of short-term services.

NRC recognizes that, in the energy, mining, mineral processing and metals technology development areas, CANMET is the primary federal link with the applicable industry sector. However, to meet client needs, NRC in most cases must cooperate with CANMET to ensure the compatibility of facilitating technologies with industry operations. A recently concluded MOU between CANMET and NRC has set forth areas of common interest and the general conditions for cooperation including accountability for progress under the MOU.

A number of joint NRC - CANMET projects to be supported by industry consortia are now underway or in the development stage. These include: membrane application to mineral processing; development of intelligent drill systems; underground production scheduling; and genetic engineering of bacteria for mineral processing. It is worth noting that to-date these joint projects have been initiated by NRC. The perception is that while CANMET is an effective partner it could adopt a more pro-active role in identifying and developing joint projects.

Natural Sciences and Engineering Research Council (NSERC)

NSERC recognizes the technological overlap with CANMET with regard to NSERC Strategic, Operating and Equipment Grants to Universities. In technology areas within CANMET's mandate, CANMET has, over the past years, been asked to review university proposals in these areas and to participate on Grant Selection Committees. Moreover, within the past year, NSERC has begun collaboration with EMR, particularly CANMET, in the joint funding of proposals under EMR's Research Agreements Program (RAP).

Within the last 2 years, NSERC has placed a much greater emphasis on university-industry interactions. This has been manifest through increased funding for cooperative university-industry projects and for NSERC-Industry Research Chairs at Universities. Under the latter program, there is currently a major university-led push for Research Chairs across Canada in mining, mineral processing, and metals areas, including environment aspects. The overall result has been a shift towards shorter term (2-5 years) applied research within the universities and therefore more potential for overlap between CANMET and the universities.

CANMET's relationship with the cooperative university-industry NSERC program and with the NSERC-Industry Research Chairs is not clear. While there are specific examples of CANMET's participation in the cooperative university-industry program, there is no set policy or strategy with regard to an overall approach. Similarly, with regard to NSERC-Industry Research Chairs, CANMET's participation in the establishment of Chairs, and ongoing interaction with the Chair holders, is not uniform. Some collaboration appears to exist in certain areas (metals technology, mineral processing, mining) and not in others (energy).

Office of Energy R&D, EMR (OERD)

OERD is the administrative arm for the Interdepartmental Panel on Energy R&D. Chaired by EMR, the Panel annually allocates about $80-90 million to R&D-performing federal departments for incremental energy-related activities. CANMET receives a major portion of this funding, particularly now that the Efficiency and Alternative Energy Technology Branch (EAETB) has been transferred to CANMET. A significant portion of these funds (upwards of 50%) are allocated to external contracts.

OERD is responsible for the coordination of planning, the setting of program priorities, and allocation of funds between federal departments. Where overlap exists between departments, the processes established and monitored by OERD provide the mechanisms to optimize federal facilities and expertise in the development of cooperative projects.

The overall program selection and funding process is perceived to have been successful in achieving this goal. To have done so required that contentious issues be identified and be resolved. Examples are the need for increased cooperation between CANMET and the Geological Survey of Canada (GSC) on coal resource and reserve studies, and between Environment Canada and Transport Canada (with CANMET as a third-party R&D provider) in relation to automobile testing facilities.

Environment Canada (EC)

Since the late '70s, when Energy R&D funds were allocated to Environment Canada (EC), effective cooperation has occurred with CANMET particularly in the development of advanced combustion systems. Other areas of collaboration included a survey of ground water quality in proximity to mining operations and development of membranes. The existence of the Panel on Energy R&D and its related mechanisms for joint planning and conduct of R&D activities has provided the forum for resolving jurisdictional issues. More recently, creation of the Mine Environment Neutral Drainage (MEND) program has established a similar process to ensure optimal cooperation between CANMET and EC on mining and mineral processing-related environmental projects.

A number of changes are currently under consideration at EC which may modify the way that departments, such as EMR, cooperate with EC. In response to greater public awareness of environment issues, EC is establishing a Science Committee. Its initial aim will be to establish a science strategy for EC. This will address a number of issues such as the federal role versus that of the provinces; the definition of knowledge gaps; the effort required to determine environmental requirements; and whether EC will limit its R&D scope to the determination of environmental specifications for purposes of regulation. Staffing limitations at EC may require that other federal departments accept greater responsibility for addressing the environmental aspects of their own technology development activities.

It is of interest to note that EC has been successful in promoting the creation of several NSERC-Industry Chairs. In so doing, EC established the precedent that includes government as an eligible funding partner with industry to lever associated NSERC funding.

B. Provincial Research Organizations (PROs)

General

The primary mandate of each PRO is to encourage and facilitate scientific and technological development within the host province. A number of factors continue to affect the ways in which PROs pursue their mandate.

Perhaps the greatest pressure on PROs over the last 5-10 years has been the need to become increasingly self-sufficient financially. Table 2 provides data on the extent of self-financing for PROs from contract revenues, royalties and licences in 1988/89. Compounding the problem of decreasing Provincial Grants has been a significant decrease in federal and provincial contract revenues. From 1985/86 through 1989/90 these fell an average of 24 and 29 percent, respectively. Offsetting this trend, industrial contract revenues increased 68 percent, during the same period.

Accompanying the increase in industrial contract revenues has been a shift in focus from scientific to technological development. The PROs perceive themselves to have a balance of portfolio downstream that of CANMET. They emphasize the need to respond to industry's short-term technological concerns. These can be characterized by optimization of existing technology and the demonstration or implementation of improved technology in client operations.

Routine services also form an important component of the overall work load. Small and medium sized business represents a larger portion of contract clientele for some PROs (Manitoba Research Council). The linkage between PROs and IRAP Technical Advisors located at each PRO has undoubtedly contributed in this regard. Increasingly, to meet financial goals and to justify retention of technical groups, the PROs are now successfully marketing their expertise and services to out-of-province and foreign clients. For routine service work, the majority of PROs operate under a policy whereby each will not compete with a private sector organization within its host province. Increasingly, as MOUs are developed between various PROs, this policy will extend outside a PRO's provincial boundaries.

As PROs respond to increasing requirements to become self-sufficient, maintenance of the optimum balance of expertise in any specific technical area becomes a primary concern. Upsizing and downsizing of groups is occurring more rapidly, depending on the success of such groups in

attracting contract revenues. This is particularly apparent for the PROs that are approaching self-sufficiency (BCRC, NBRPC, ORTECH). Rapid changes in the penetration by federal laboratories in specific technology development markets can cause major internal changes within PROs.

Overlap and Duplication of Technology Development Effort

All PROs undertake contracts or conduct programs that overlap with the technology mandate of CANMET. The areas in which some overlap occurs can represent a substantial portion of a PRO's activities, such as is the case for ARC, or a very minor portion, such as for MRC.

In general, a certain amount of overlap is desirable since the PROs tend to focus on shorter-term applications or transfer of newly developed technology. This is particularly true for the PROs that are relatively self-sufficient. Overlap in these cases is complementary to CANMET and, indeed, provides CANMET with technology transfer assistance in reaching regional clientele. This form of cooperation between CANMET and the PROs is mutually recognized as of value to both classes of organization. Where MOUs have been concluded (ARC, SRC, CRM) this issue has been addressed.

PROs were generally satisfied with the cooperation and collaboration exhibited by CANMET, with two notable exceptions. One is apparent duplication in the tar sands and heavy oils programs, particularly upgrading, at CANMET and ARC. There is, however, a mechanism in place to resolve this duplication, and progress has been made. Nevertheless, the two programs are seen to be in potentially strong competition, and further discussion may be appropriate. The second case concerns a heat exchange facility established by CANMET that duplicated an ORTECH facility, apparently with no prior consultation.

Other than the two cases cited above, the PROs consider that cooperation and links with CANMET are good. This was also the case for ARC and ORTECH in relation to other program areas. PROs which do not currently have a MOU with CANMET generally expressed a desire to establish one. Specific interest was expressed by most PROs to act as providers of technology transfer to regional clients for technology developments expected to arise from the new Varennes Laboratory.

Routine Services and Competition with CANMET

In general, any competition CANMET offers in the conduct of routine services is not a major concern of the PROs. CANMET's policy of not undertaking services of a standardized recurring variety where other private sector performers (including PROs) exist appears to have been successfully implemented. This issue can become somewhat complicated in that, although similar testing facilities can exist outside CANMET, a client may still opt for CANMET to undertake the work.

Technology Development Project Marketing - Single Client

This class of project can be of a short-term variety such as optimization of existing technology, or it can extend to a longer time-frame, e.g. 2-5 years. While all PROs focus on the former, a significant percentage of revenues can occur from the latter, particularly for those PROs that have retained substantial provincial grants and can therefore partially subsidize longer term work.

Following recent changes in CANMET, including an overall shift of portfolio to the shorter term together with higher cost-recovery targets, this class of project has also increased in importance. It represents probably the highest degree of potential competition between CANMET and the PROs. Nevertheless, relatively few cases have been cited where direct competition from CANMET has had negative impact on a PRO. This is likely due to the existing cooperative agreements between CANMET and the PROs that recognize the need for complementarity and some overlap of programs while eliminating unnecessary duplication.

Examples of competition from CANMET in specific technology areas have been identified where certain PROs have decided to phase out their expertise. In these cases, some negative feelings towards CANMET have persisted. At the same time, the PROs recognize the need to continuously evaluate resource allocations to ensure that the correct balance of staff and facilities are in place to respond to market needs. The issue appears to be not that rationalization of effort was required but the way in which it became apparent. Since the terms of reference of this study did not include investigation of competition, these cases have not been reported in detail. Information obtained has, however, been provided to CANMET management.

Multi-Client Studies

While these are a major portion of CANMET's portfolio, and normally are of longer term (3-5 years), they do not represent a significant activity in the PROs. In principal, this class of project is an opportunity for the PROs to work jointly with CANMET, particularly on the downstream end of a project. However DSS guidelines require that the PROs participate with no allowance for profit. It is therefore to a PRO's benefit to contract directly to industry rather than work jointly with CANMET. The technology areas in which these tend to occur include heavy oil, oil sands, and coal, and involve primarily ARC and SRC. Both organizations appear satisfied with the efforts of CANMET to deal with the federal bureaucratic aspects associated with the eligible programs.

Cost Recovery

Rates for 1990 were requested of the PROs to compare with CANMET's approved rates. In no case were any of the 1990 PRO rate schedules higher than CANMET's for 1989. One perception expressed was that the CANMET rates appeared to be rather arbitrarily set and did not reflect true costs of government laboratories. In general, the PROs are satisfied with the rates charged by CANMET.

Another issue, relates to the apparent practice of CANMET charging less than full cost for a specific cost recovery job. CANMET enters these types of arrangements in ways that are permitted under the Treasury Board guidelines on cost-recovery. For example, the policy accepts less than full cost recovery if the work has national benefits, or if there are specific advantages for the Crown as well as for the client. Reduced charges are also acceptable if the client merits support but has inadequate resources, for example, if the work helps establish a new industry. This resembles bidding practice within the private sector. Not all PROs have the latitude to do this, and therefore view this practice as unfair. It should be noted that CRM is an exception amongst PROs in that its policy is to charge industrial clients within the province of Quebec only 50% of the project costs. This CRM practice is expected to be phased out, however, over the next 5 years in order to meet a significant increase in the target for financial self-sufficiency.

A similar situation exists within CANMET whereby CANMET and a partner can each fund their own efforts in a joint project. PROs must charge for all in-house effort and therefore view CANMET as having an unfair advantage in establishing technical relationships with industry partners.

C. Provincial Government Departments

All Provincial Departments contacted with a mandate for energy technology development are members of the Interprovincial Advisory Committee on Energy (IPACE). Two IPACE subcommittees are currently in place: Coal Coordination; and Conservation and Renewable Energy. There are mixed feelings about the effectiveness of the former since it is limited essentially to information exchange. The latter has been a more effective forum as it has addressed technology transfer and has undertaken some worthwhile studies. The area of tar sands and heavy oil are not addressed per se by either subcommittee. However CANMET's MOUs with ARC and SRC include the major part of the Alberta and Saskatchewan provincial government programs. Discussion with senior officials of the Departments of B.C., Alberta, Saskatchewan, Ontario and Nova Scotia yielded no expressed concerns about duplication between federal and provincial energy technology programs. While there was familiarity with CANMET programs, there was a general lack of knowledge about the status of the Varennes laboratory and its intended scope.

The Provinces of Alberta and Nova Scotia are particularly well linked in energy R&D. In Alberta, a CANMET representative has participated as an observer in the functions of the office of Coal Research & Technology as well as officially with the Alberta/Canada Energy Resources and Research Fund granting process. In Nova Scotia, the provincial government has stimulated a multi-client coal R&D program in which CANMET participates.

The Ontario Ministry of Energy (MOE) has provided funding of $6 million over the last 3 years to joint projects under the EnerSearch Program. This has stimulated more than $21 million of projects covering research, development, testing and initial demonstration of energy technologies. To be eligible, proponents must provide more than 50 percent of the net costs. Some concern was expressed by a provincial official that, since CANMET's funding requirements for proponents are not as demanding, some proponents have opted to work with CANMET rather than with MOE.

Provincial funding programs administered by the Provinces' Science Councils can be substantial, yet there appears to be little knowledge of specific programs and projects within both Provincial Energy and Mines Departments and CANMET. Projects receiving funds are conducted by universities and the private sector. Coordination of these activities with national programs is not apparent. As an example of the scope of Science Council programs, the Science Council of B.C. operated a number of granting and special programs with a 1989 budget of some $15 million. Research grants of more than $500,000 were awarded in 1988/89 in the areas of energy and mining, minerals and metals to both industry and universities. This exceeds the annual awards made by CANMET under EMR's Research Agreements Program.

CONCLUSIONS

Overall, the amount of overlap which exists between CANMET and the federal and provincial organizations contacted appears to be desirable from the viewpoint of the entire spectrum of technology development. Each organization is focused on either compatible technologies (federal) or a particular part of the spectrum (provincial). Cooperation amongst them is geared to increase complementarity of programs and to optimize delivery of commercializable technology. There is a somewhat greater potential for overlap between CANMET and the PROs now. This is being addressed. The same potential for overlap pertains to CANMET's programs and the NSERC Research Chairs, and perhaps the Provincial Science Councils' programs. A summary of the interactions between CANMET and these organizations is provided below.

The balance of CANMET's R&D portfolio has moved towards the shorter term during the past three years. Similar strategic changes taking place within the NRC have also forced greater emphasis on shorter term R&D. Accordingly, the NRC has aggressively been seeking industry partners for development of facilitating technologies applied to the resource industries. In recognition of CANMET's leading role in energy, mining, minerals and metals, and consistent with the MOU between the two organizations, NRC has sought the involvement of CANMET in establishing joint projects.

Upcoming changes at Environment Canada (EC) will address the R&D priorities of the Green Plan. EC is considering a shift away from the more applied project orientation it has maintained since the late 70s. Should this occur, a gap will be created in the study of environmental aspects of new process technologies for the resource industries unless departments such as EMR expand their R&D programs.

NSERC Strategic, Operating and Equipment Granting programs remain focused on longer term R&D. Since the process of awarding grants to universities related to the mandated R&D areas within CANMET involves CANMET personnel, there is full awareness of these university awards. There has been a recent increase in the creation of NSERC/Industry Chairs at Universities. CANMET personnel do not appear to be fully aware of R&D activities conducted through these Research Chairs.

CANMET's balance of portfolio is now closer in time-frame to those of the PROs. Accompanying this shift has been a greater amount of discussion between CANMET and the PROs and the conclusion of several cooperative agreements. While CANMET and the PROs are both very active in the marketing of short-term (0-2 yr) single-client supported projects, the perceived level of competition does not overly concern the PROs. Nevertheless, overlap and potential duplication exists between CANMET, SRC and ARC in tar sands and heavy oils R&D, particularly upgrading. Mechanisms exist to resolve this issue.

Mechanisms exist to promote the collaboration and coordination with Provincial government programs delivered by the Resource Departments. These include the Mineral Development Agreement Management Committees, the Mine Environment Neutral Drainage Program and the IPACE Subcommittees. In Alberta, where potential for overlap is the greatest, CANMET personnel participate in the provincial process of proposal review and the awarding of contracts.

Programs delivered by Provincial Science Councils cover a range of short and long-term projects and programs. As mentioned in the report, there appears to be little awareness of these activities amongst CANMET personnel.

With regard to cost recovery, CANMET's practices resemble those of an industry R&D laboratory more than those of a PRO in certain respects. For example, CANMET contracts-out R&D, often as a complement to in-house efforts. CANMET also enters joint or cost-shared projects with each partner having both technical and financial responsibilities. Most PROs cannot function in this way due to annual bottom-line accountability and accordingly perceive that CANMET has an unfair advantage in developing front-end relationships with clients. However, this appears to be a function of federal policy directives, not of unfair commercial practices.

On the issue of provision of routine services, the PROs generally feel that CANMET is not competing with PRO capabilities. As might be expected, there are some apparent examples of CANMET practices which would appear to be in conflict with CANMET's official policy. Similarly, competition for single client-supported projects of a longer-term nature has taken place. As a result rationalization of expertise at PROs was required.

Since investigation of specific cases of competition between CANMET and the PROs was outside the terms of reference of this study, no details are included. However, identification of such cases and perceptions of PROs affected have been provided to CANMET management for its information, together with recommendations resulting from this study.

Table 1

Organizations Contacted

Federal Government Organizations	Telephone Interview	Personal Interview
Mining Research Laboratories/CANMET		✓
Mineral Science Laboratories/CANMET		✓
Metals Technology Laboratories/CANMET		✓
Energy Research Laboratories/CANMET	✓	
Coal Research Laboratories/CANMET	✓	
Efficiency and Alternative Energy Technology Branch/CANMET		✓
Office of Energy R&D/EMR		✓
National Research Council of Canada		✓
Natural Sciences and Engineering Research Council		✓
Environment Canada		✓
Provincial Research Organizations		
Association of Provincial Research Organizations		✓
British Columbia Research Corporation	✓	
Alberta Research Council	✓	
Saskatchewan Research Council	✓	
Manitoba Research Council	✓	
ORTECH International	✓	
Centre de recherche industrielle du Québec	✓	
Centre de recherches minérales	✓	
New Brunswick Research and Productivity Council	✓	✓
Nova Scotia Research Foundation Corporation	✓	
Provincial Government Departments		
British Columbia Ministry of Energy, Mines & Petroleum Resources	✓	
Alberta Department of Energy	✓	
Saskatchewan Department of Energy & Mines	✓	
Ontario Ministry of Energy	✓	
Nova Scotia Department of Mines & Energy	✓	

Table 2

Provincial Support of PROs

Provincial Research Organizations	1988/89 Revenues[1] ($000)	%Provincial[2] Support
British Columbia Research Corp	-	0
Alberta Research Council	40,012	48
Saskatchewan Research Council	17,157	43
Manitoba Research Council	5,421	53
ORTECH International	29,630	12
Centre de recherche industrielle du Québec	29,952	58
Centre de recherches minérales	10,000	53
New Brunswick Research and Productivity Council	7,400	11[3]
Nova Scotia Research Foundation Corporation	7,050	37

(1) Fiscal year varies between calendar year and year ending March 31, 1989

(2) In some cases, includes grant to cover building accommodation, eg., SRC - $2.1 million

(3) ACOA provided an additional grant equivalent to about 10% of revenues

Addendum

SPECIFIC ISSUES IDENTIFIED

New Brunswick Research and Productivity Council (NBRPC)

- Image Analysis
  Following an agreement between NBRPC and CANMET on cooperation in the field of image analysis, NBRPC purchased some $1 million of equipment. NBRPC understood that CANMET would refer image analysis work to them. This apparently has not happened, at least to the extent NBRPC believes should have occurred. Nonetheless relationships with senior personnel in the image analysis area are said to be good.
- Fluid Bed Roasting, Leaching
  Competition has arisen with CANMET: cited was work with Nova Gold. CANMET was said to have initiated an in-house project under opposition from NBRPC but with no dialogue from CANMET. NBRPC are now active with several clients in this area and use this to underline the excellence of their expertise and facilities.

British Columbia Research Corporation (BCRC)

- Microbiological leaching
  Several years ago, competition in this area between CANMET and BCRC resulted in BCRC phasing out their related expertise. Although they recognize the need to constantly revise budgetary and personnel allocations to the various technical areas, some resentment remains as to the way in which this specific case developed.

Conflict of Interest: Contracting-out/Contracting-in

Several PROs commented on the duality of CANMET being a "funder" and a "doer" and the fact that this dual role cannot avoid leading to conflicts of interest. There are a number of ways in which conflicts can occur.

- CANMET as a funder is a recipient of unsolicited proposals. For any of several reasons a proposal may be rejected. If the concept is of interest, it can be difficult for a CANMET scientist not to attempt to develop the concept.
- A somewhat similar case was quoted where a PRO was identified as a sub-contractor in a proposal submitted by an industrial firm. The contract was approved but the component of work to be done by the PRO was instead done in-house in CANMET.
- A more common case exists where CANMET contracts-out a component of an in-house project. Both components are closely related hence the contract officer selected is usually closely associated with the in-house effort. This places the contract officer in a potential conflict of interest as regards intellectual property owned by a contractor.

Addendum

RECOMMENDATIONS

The following recommendations arise from the MNACC Comparison Project and are intended to strengthen CANMET's perceived role as a national leader in energy, mining, minerals, and metals R&D. They are made in recognition of the changing R&D environment both federally and provincially: no changes are suggested which impact directly on the primary mission of CANMET or its business-oriented targets.

To fully develop its national leadership role, and recognizing its internal requirement to move away from unsponsored projects, CANMET should more fully utilize the opportunity to identify and develop innovative R&D projects;

- by encouraging the full use of the allowance to conduct exploratory R&D of up to 10% of its in-house resources; and
- by strengthening its awareness and links with the existing and proposed NSERC/Industry Research Chairs as well as those programs implemented by Provincial Science Councils.

- It is recommended generally that CANMET be more pro-active in seeking joint federal government partners (NRC) to meet the technology needs of its clients for which CANMET is the major federal link.
- Similarly, it is important that CANMET move quickly to resolve the potential overlap and duplication with ARC and SRC in the area of heavy oil and tar sands R&D so that the full technological capacity of these organizations can be developed in a complementary fashion.
- Further structuring of cooperative agreements with the PROs would be advantageous and could assist CANMET in a number of ways including: provision of technology transfer agents on a regional basis particularly where a diverse client base may exist (markets for the Varennes Laboratory); the ability of a PRO to respond more quickly to the establishment of facilities and expertise to address new program or project areas; and the opportunity to more fully utilize unique facilities and expertise existing at specific PROs.
- As regards the potential conflict-of-interest that can arise from its dual role of contracting-out and conducting in-house research, it is suggested that a rigorous code of ethics consistent with CANMET's intellectual property policy be established and specific cases of potential conflict-of-interest be monitored.
- It is recommended that the access by PROs to CANMET's contracting-out activities be encouraged in recognition of the complementary role they can play in delivering and supporting commercializable technology and that CANMET support any initiatives which may come forward from the PROs for modification of the conditions set by D.S.S. and affecting commercial returns to the PROs.

Addendum

- With respect to cost-recovery practices, it is important that CANMET continue to honour the policy of non-competition with other laboratories for standardized, recurring services by always making potential clients fully aware of other sources for such services.
- It is presumed that, as new cooperative agreements are established with the PROs and major single or multi-client-supported projects arise which can seriously affect the continued existence of a major facility and associated expertise at a PRO, CANMET will fully consider joint conduct of such a project providing that a national rationalization of facilities and expertise is not required. The incidences of cost-sharing by CANMET of a single-client study, for reasons of ready access to information when CANMET conducts all the work, should be kept to a minimum.